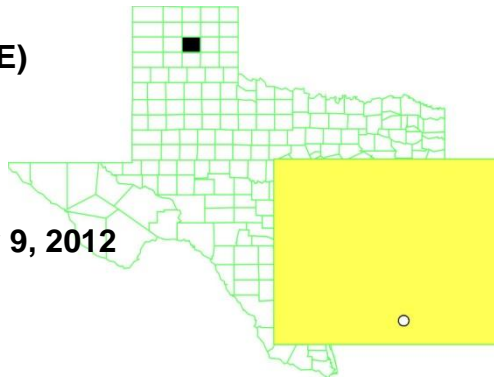


**PANTEX PLANT (USDOE)**  
**Carson County, Texas**  
**EPA ID# TX4890110**  
**Site ID: 0604060**

**EPA Region 6**  
**Congressional District 13**

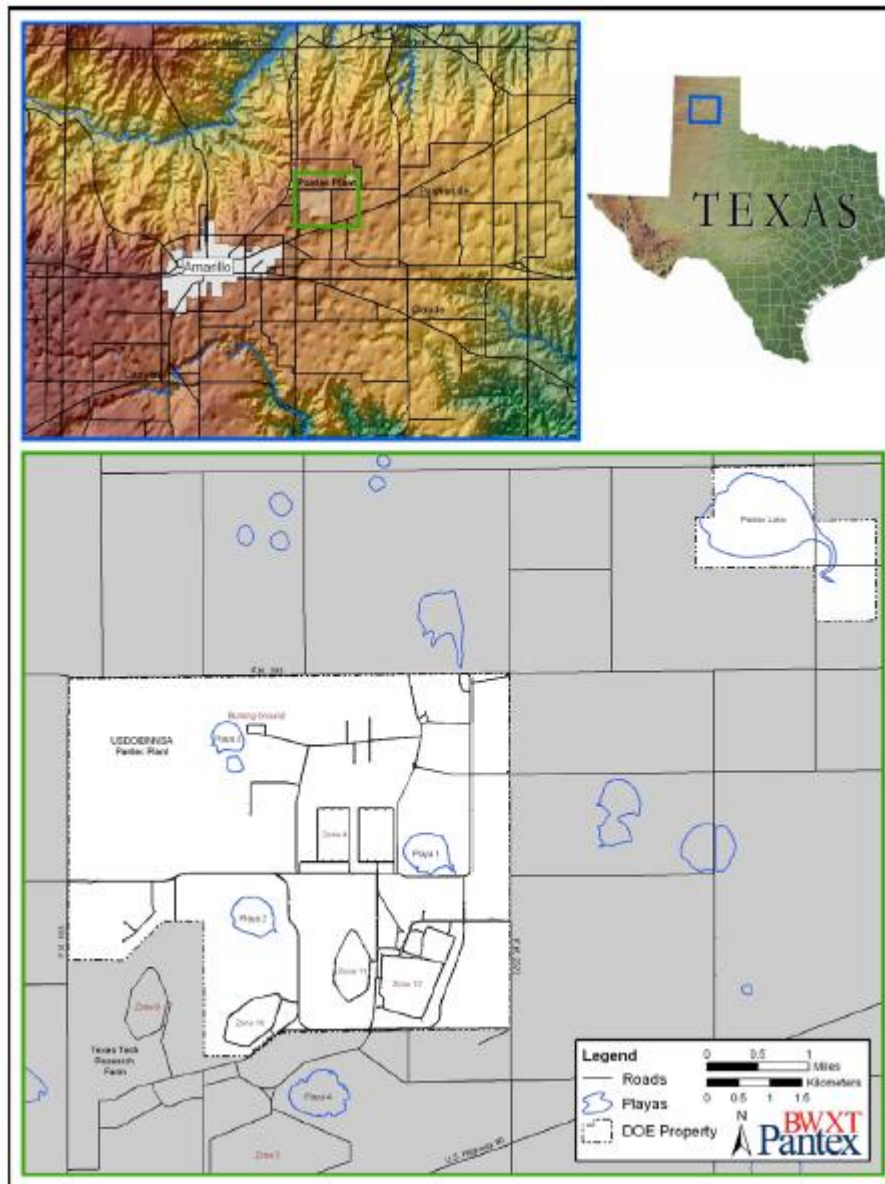
**Last Updated: October 9, 2012**

**Contact: Camille Hueni**  
**214.665.2231**



## Background

The Pantex Plant Superfund Site is located 17 miles northeast of Amarillo, Texas, in Carson County. It is an active Federal Facility owned by the U.S. Department of Energy/National Nuclear Security



**Pantex Plant Reference Map**

Administration (USDOE/NNSA) and managed and operated by Babcock and Wilcox Technical Services Pantex, LLC (B&W Pantex). The facility occupies approximately 16,000 acres with approximately 10,000 of these acres owned by the U.S. Department of Energy (DOE) and 6,000 acres leased from Texas Tech University (TTU). The acreage leased from TTU serves as a buffer zone for site safety and security.

The Pantex Plant was established in 1942 to build conventional munitions and high explosives compounds in support of World War II. The Plant facility was deactivated in 1945 and sold to Texas Technological University, currently known as Texas Tech University, subject to recall by the War Assets Administration. TTU used the property for agricultural purposes until 1951, when the Pantex Plant was reclaimed for use by the Atomic Energy Commission, as a nuclear weapons production facility. Portions of the conventional weapons plant were renovated, and new facilities were built for the manufacture of HE compounds. Current operations include the development, testing, and fabrication of HE components; nuclear weapons assembly and disassembly, interim storage of plutonium and weapon components; and component surveillance.

The Pantex Plant's historical waste management practices have included thermal treatment of explosives, explosive components, and contaminated liquids and solvents (including test residues of explosives and depleted uranium); burial of industrial, construction, and sanitary waste in unlined landfills; disposal of solvents in pits or sumps; discharge of untreated industrial wastewaters to unlined ditches and playas; and the use of surface impoundments for the disposal of chemical constituents. These prior practices resulted in the release of both chemical and radionuclide constituents to the environment.

## Current Status

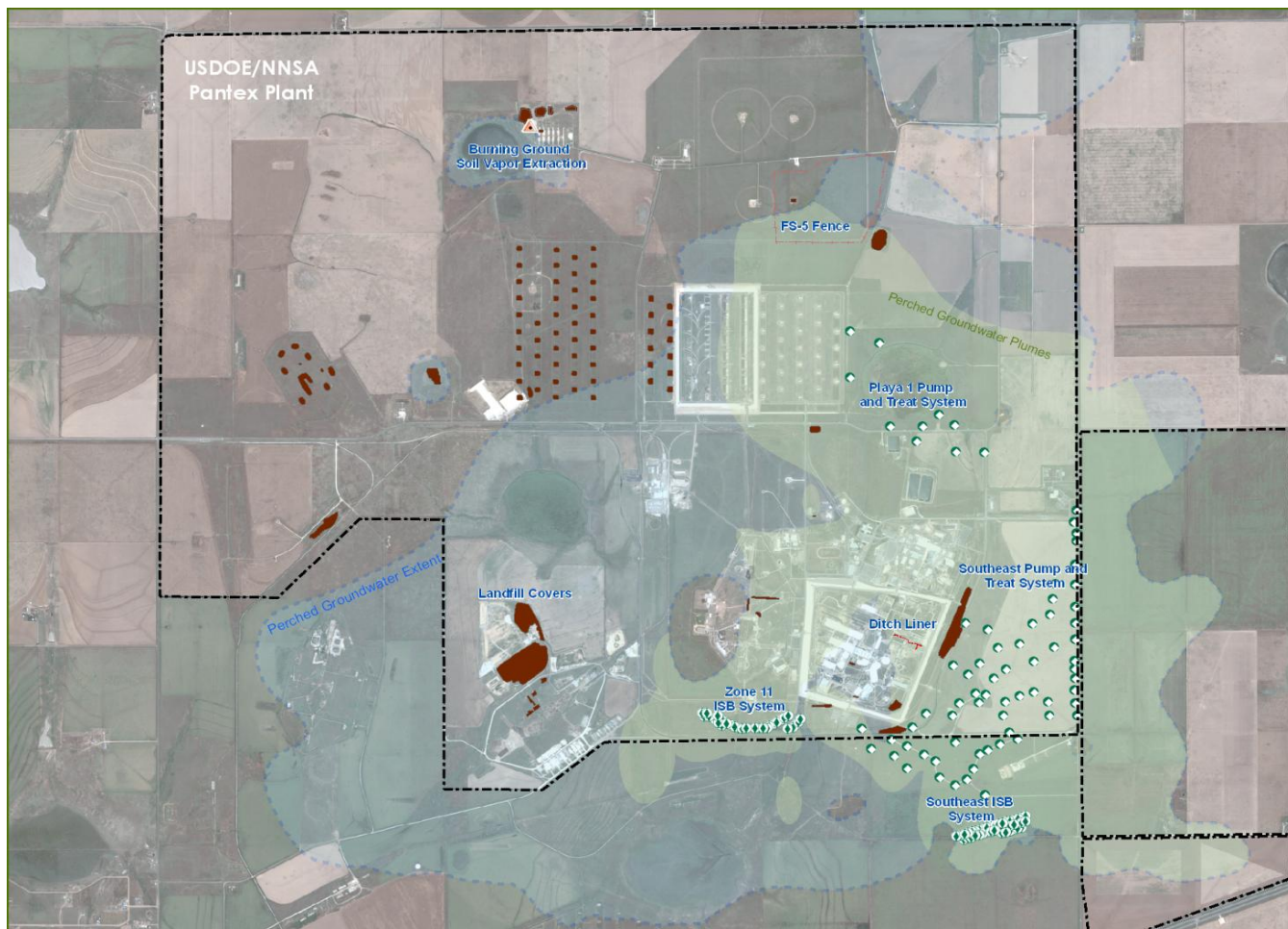
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**Ongoing Operation and Maintenance of the Selected Remedy:** The U.S. Department of Energy/National Nuclear Security Administration (USDOE/NNSA) began operating and maintaining components of the Selected Remedy in July 2009, following EPA Region 6 approval of the *Final Preliminary Close Out Report*. The main focus of remedial action at the Site is long-term cleanup of a perched layer of ground water. Four systems have been implemented to address different aspects of the plume of contaminants in this perched ground water (depicted in green on the figure presented below); the Playa 1 Pump & Treat System, the Southeast Pump and Treat System, the Southeast In-Situ Bioremediation (ISB) System, and the Zone 11 ISB System.

Collectively, these systems work to reduce perched ground water saturation in the thicker, center of the perched groundwater and enhance degradation and attenuation of contaminants (primarily high explosive compounds, chlorinated solvents, hexavalent chromium, and perchlorate) along the extent of the perched ground water. The ISB Systems were placed in areas more susceptible to downward migration of contaminants, where the saturated interval of the perched ground water is thin, and therefore is not amenable to extraction and aboveground treatment.

The Pump and Treat Systems appear to be operating as originally intended. More than 164 million gallons of perched groundwater has been extracted and treated through the Playa 1 Pump & Treat System since beginning operation in September 2008. Likewise, more than 891 million gallons of perched groundwater has been extracted and treated by the Southeast Pump and Treat System since it began as a treatability pilot study in 1995. The USDOE/NNSA continues to strive to reduce the volume of water injected back into the perched zone by improving the capabilities of the subsurface irrigation system at the Site that is the primary disposition target for the treated water.

The In-Situ Bioremediation Systems also appear to be performing as projected. Data from the treatment zone created by the Southeast ISB System indicate degradation/attenuation of contaminants; likewise down-gradient performance monitoring wells support this understanding. Data from the treatment zone created by the Zone 11 ISB System also indicate degradation/attenuation of the contaminants; but it appears to be too soon for confirmation through the down-gradient performance monitoring wells.



**2011 Annual Remedial Action Progress Report:** USDOE/NNSA has submitted the *2011 Annual Report, Remedial Action Progress Report (June 2012)* and the *1<sup>st</sup> Quarter 2012 Quarterly Progress Report [for ground water]* for regulatory review. The reports detail the third year, and the following FY12 1<sup>st</sup> Quarter, after the construction and implementation of remedial actions selected in the 2008 Record of Decision and is part of the ongoing remedy review and evaluation. This reporting and evaluation process supports the regular review of remedy effectiveness and will provide a baseline for the first CERCLA Five-Year Review in 2013.

**Final Interim Remedial Action Report (IRAR):** The USDOE/NNSA submitted the final *Interim Remedial Action Report (IRAR)* on May 11, 2010. The U.S. Environmental Protection Agency (EPA) Region 6 approved the final package after evaluating the collection of documents, which provide construction details for the remedial actions taken at the Site, including ground water and land use controls. EPA approval of the document formally closed the construction phase for the Site and initiated the Operation and Maintenance phase of the Selected Remedy, including Long Term Monitoring of ground water. All remedial systems are in place and functioning as expected; maintenance and optimization will be ongoing until remedial objectives are met for the Perched Aquifer. After remedial objectives are met, the Final Remedial Action Report will be submitted for regulatory review and concurrence.

**State of Texas Compliance Plan Modified:** On September 16, 2010, the Texas Commission on Environmental Quality (TCEQ) issued a modified Compliance Plan (CP-50284) to USDOE/NNSA Pantex Plant to formally include the remedial objectives of the federal CERCLA Selected Remedy in the State's Corrective Action Compliance Plan, fulfilling the State regulatory requirements under the RCRA authority.

Similarly, the CERCLA Record of Decision recognized and incorporated the interim and early RCRA actions taken to mitigate releases of hazardous substances under the State's parallel authority. Modification of the TCEQ Compliance Plan synchronizes Federal and State recognition of the Operations and Maintenance phase of the remedial action, including long-term monitoring of ground water to track progress toward achieving cleanup objectives.

**Remedy Construction Completed in July 2009:** The EPA Region 6 has concurred that construction of the Sitewide Remedy selected in the September 2008 Record of Decision has been completed. The final *Preliminary Close Out Report* (PCOR) was submitted by the U.S. Department of Energy/ National Nuclear Security Administration (USDOE/NNSA) on July 12, 2009, in accordance with Article 8.7 of the December 2007 Interagency Agreement (IAG), and as a deliverable under the Site Management Plan. Comments provided by EPA and the TCEQ on the May 2009 draft document were incorporated in this final PCOR.

Under the Interagency Agreement, the USDOE/NNSA prepared and submitted the PCOR after completion of the last response action (remedial or removal) and the final site inspection, and documented the effective date of the completion of all Site construction. The final PCOR provides a summary of construction activities completed in response to the 2008 ROD, including construction of the Zone 11 In-Situ Bioremediation (ISB) ground water component. The pre-final inspection was conducted by USDOE/NNSA, Babcock and Wilcox Technical Services, EPA, and TCEQ on May 5, 2009. At that time, there were two final response actions yet to be completed. The initial injection of amendments at the Zone 11 ISB system was ongoing at the time of inspection, but was completed shortly thereafter, on June 1, 2009. The final action, construction of the fence surrounding Firing Site 5, was completed June 3, 2009. Accordingly, USDOE/NNSA has documented the effective date for Construction Completion as June 3, 2009.

## Benefits

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The site-wide remedial actions selected in the 2008 Record of Decision address current and potential future threats to human health and the environment, including:

- Releases to soils that pose a direct contact risk to onsite workers;
- Releases to soils at concentrations that may impact perched groundwater above drinking water standards;
- Perched groundwater that is impacted above drinking water standards and requires remedial actions;
- Perched ground water impacted above drinking water standards that could potentially impact the Ogallala aquifer above drinking water standards.

Response actions at the Pantex Plant are dominated by actions to mitigate perched ground water contamination. The perched groundwater meets the yield and quality criteria to be considered a potential drinking water source, so its restoration to drinking water standards is one goal of the Sitewide remedy. An equally important concern is that contaminants in the perched ground water may act as a source of future impacts to the underlying Ogallala Aquifer. Protecting the Ogallala Aquifer from future impact by addressing contamination in the perched is one of the primary goals of the response action.

Remediation of contamination at the Pantex Plant site will ensure that human health and Regional ground water resources are protected into the future.

## National Priorities Listing (NPL) History

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NPL Inclusion Proposal Date: July 29, 1991  
NPL Inclusion Final Date: May 31, 1994  
HRS Score: 51.22

**Population:** The Site is located in a rural area between Amarillo, Texas (249,881 people) and Panhandle, Texas (2452 people).

**Setting:** The predominant land use immediately surrounding Pantex Plant and Pantex Lake is agricultural, including grazing of livestock and cultivation of crops. Pantex Plant will continue as an active DOE facility; current and future land use is industrial.

**Hydrology:** Pantex Plant is located on the plains of the Texas Panhandle, 17 miles northeast of Amarillo, Texas. The Ogallala Aquifer, part of the High Plains aquifer system, is the principal water-bearing unit and provides a primary source of water for the region. Additionally, bodies of perched ground water above the Ogallala Aquifer occur beneath much of Pantex Plant. Areas of this perched ground water zone have been contaminated as a result of past wastewater discharges from legacy operations at the facility. The historical discharge of industrial wastewater to the ditch and Playa system, combined with natural recharge, drove contaminants and accumulated surface water through the vadose zone to the top of a low permeability zone, referred to as the Fine-Grained Zone (FGZ). Water collects on the top of the FGZ, creating the localized perched ground water system. The footprint of the perched ground water is primarily onsite, but extends offsite to the east and onto the TTU property to the south. The perched ground water, or "Perched Aquifer," is located at 215 to 280 feet below ground surface. The perched groundwater is moving toward the south-southeast.

The Ogallala Aquifer is the major drinking water resource for this part of the Texas High Plains region. The highest volume use, however, is for irrigation. At the Pantex Plant, the Ogallala Aquifer is 340-500 feet below ground surface. Regionally, Ogallala groundwater flows to the southeast. However, direction of flow at Pantex is to the north-northeast, controlled by high pumping rates at the City of Amarillo's water well field, located just north of the Pantex Plant northern boundary. The water well field and irrigation in the region also locally controls the level of the Ogallala; the water table shows a higher rate of decline in the northern monitoring wells at Pantex, than for those located at the southern boundary. Regionally, water levels have been dropping for the Ogallala, as irrigation for agricultural purposes has expanded, outpacing natural recharge from the surface. Both the perched groundwater and the Ogallala Aquifer are unconfined.

**Principal Pollutants:** Perched ground water is impacted by the following constituents at concentrations exceeding drinking water standards:

- |                              |                              |                           |
|------------------------------|------------------------------|---------------------------|
| • 1,2 Dichloroethane         | • 4-Amino-2,6-dinitrotoluene | • Trichloroethene (TCE)   |
| • 1,3,5 Trinitrobenzene      | • Hexavalent Chromium        | • Perchlorate             |
| • 1,3 Dinitrobenzene         | • Total Chromium             | • 1,4 Dioxane             |
| • 2,4 Dinitrotoluene         | • RDX                        | • Chloroform              |
| • 2,6 Dinitrotoluene         | • TNT                        | • Tetrachloroethene (PCE) |
| • 2-Amino-4,6-dinitrotoluene |                              |                           |

Principal pollutants for soils include RDX, TNT, HMX, and depleted uranium. Radiological impacts were confined to soils, at levels generally below risk-based levels (i.e. Site Relevant Contaminants (Th-232, U-234, U-238, U-235, Pu-239)).

## Site Description

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The Pantex Plant is a Federal Facility owned by the U.S. Department of Energy/National Nuclear Security Administration (USDOE/NNSA) and managed and operated by Babcock and Wilcox Technical Services Pantex, LLC (B&W Pantex). The facility occupies approximately 16,000 acres with approximately 10,000 of these acres owned by the U.S. Department of Energy (DOE) and 6,000 acres leased from Texas Tech University (TTU). The acreage leased from TTU serves as a buffer zone for site safety and security. Current operations include the development, testing, and fabrication of HE components; nuclear weapons assembly and disassembly, interim storage of plutonium and weapon components; and component surveillance.



The Pantex Plant's historical waste management practices have included thermal treatment of explosives, explosive components, and contaminated liquids and solvents (including test residues of explosives and depleted uranium); burial of industrial, construction, and sanitary waste in unlined landfills; disposal of solvents in pits or sumps; discharge of untreated industrial wastewaters to unlined ditches and playas; and the use of surface impoundments for the disposal of chemical constituents. These prior practices resulted in the release of both chemical and radionuclide constituents to the environment that have been fully investigated and addressed by the selected Sitewide remedy.

The major threat to human health and the environment for the Pantex Plant project is from impacts to groundwater from industrial operations onsite. Large volumes of industrial wastewater were historically discharged to ditches, which in turn, drained to the onsite playas. The perched groundwater, beneath Pantex Plant, and adjacent to the east and south boundaries, is impacted by chemical contaminants above drinking water standards. Most importantly, there is a high potential for contaminants to migrate downward to the underlying Ogallala Aquifer if remedial action is not taken. Therefore, the development of remedial actions has focused on treating, reducing, and containing contaminants in the perched groundwater to protect the Ogallala, the principal source of drinking water in the region. The City of Amarillo's public water supply is pumped from wells just north of Pantex.

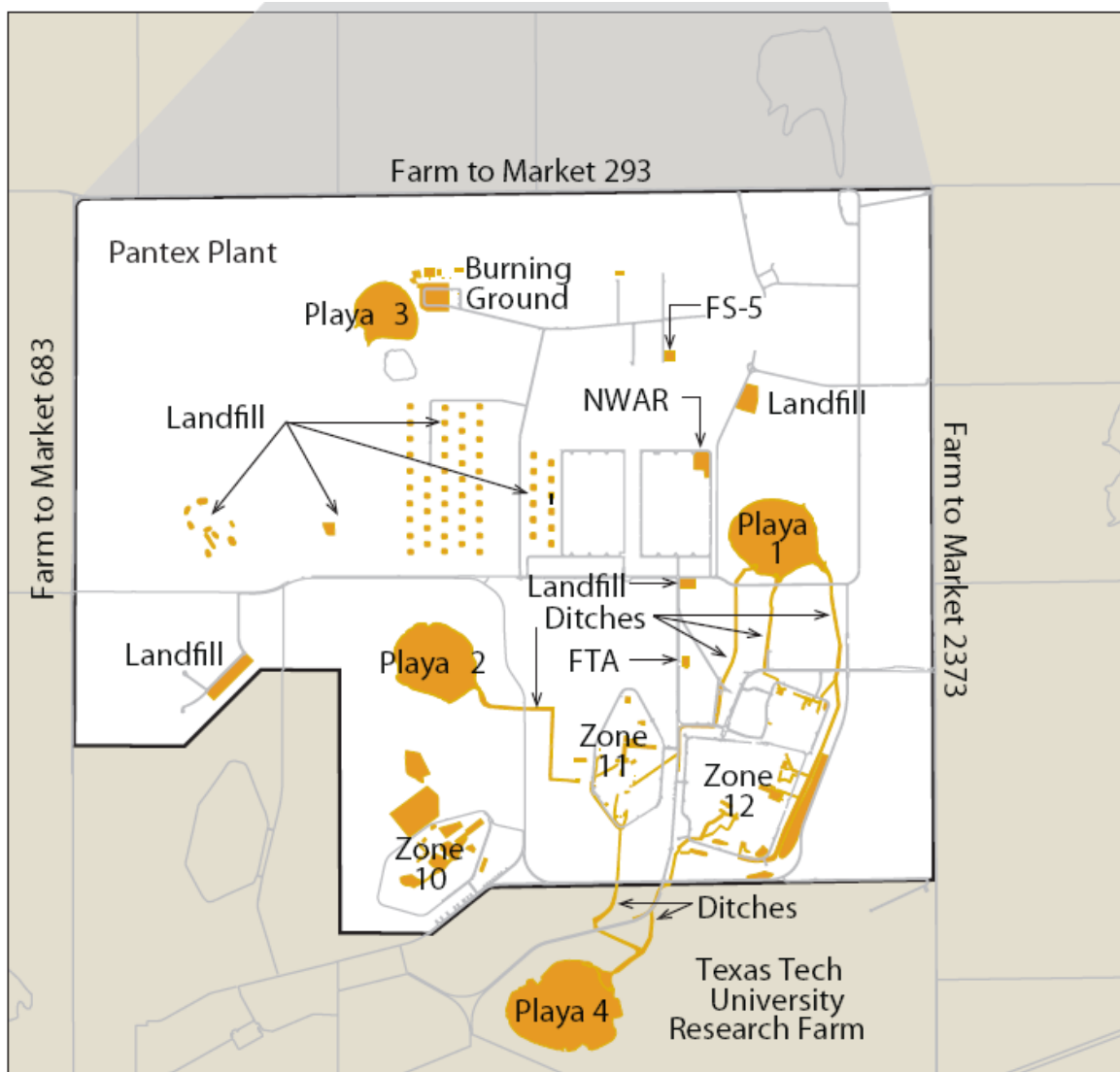
The principal source of ground water for the region is the Ogallala aquifer, the primary unit of the High Plains Aquifer. The Ogallala Aquifer ranges in depth from approximately 340 feet bgs south of the Pantex Plant to approximately 500 feet bgs at the northern Plant boundary. The Ogallala is the primary source of domestic, municipal, and agricultural water supplies for the area. The Amarillo water supply well field, located north of the Plant, produces an annual average of about 18 million gallons per day. The closest of these supply wells is 2,100 feet north of the Plant boundary.

A perched ground water zone, located (on average) 150 feet above the Ogallala aquifer, is the shallowest water-bearing zone in the area, and is consequently the first ground water unit affected by the migration of constituents released from the Pantex Plant SWMUs.

The largest area of perched groundwater underlying the Pantex Plant is associated with natural recharge from Playas 1, 2, and 4, treated wastewater discharge to Playa 1, and historical releases to the ditches draining Zones 11 and 12. For the ground water remedial goals, Perched ground water at the site was considered a potential drinking water source, based on yield and quality. The perched ground water, however, is not being used as a potable water source. RDX and hexavalent chromium are the primary contaminants, and risk drivers, for the southeast plume, both onsite and offsite to the east and south. Similarly, perchlorate and TCE are the primary contaminants for the separate Zone 11 plume, onsite and offsite to the south of Pantex Plant.

Operations also resulted in past releases of contaminants to soils, but numerous interim corrective measures (ICMs) have reduced the risk to human health and the environment once posed by the soil units. ICMs were implemented to reduce risk identified through the investigations, primarily between 1996 and 2003. These ICMs addressed 57 soil units by minimizing direct contact risk to onsite workers and impacts to the environment (i.e., transport through the ditches to the playas or through the soil column to groundwater). Interim early actions completed at Pantex Plant include removal of more than 25,000 cubic yards of contaminated soil, construction of landfill covers, deactivation and decommissioning (D&D) of facilities at major release areas, lining ditches near a major release area in Zone 12, and construction/operation of soil vapor extraction systems in Zone 11 and at the Burning Ground.

The figure below outlines the 254 Solid Waste Management Units investigated to define extent for releases of hazardous constituents to the environment.



Major Site Features at Pantex Plant

**Regulatory Framework:** In the late 1980s, the DOE Office of Environmental Management (EM) initiated the Environmental Restoration Project at the Pantex Plant. In 2000, the USDOE/NNSA succeeded DOE EM as the designated lead federal agency to investigate, assess, and remediate environmental releases at the Pantex Plant.

The Pantex Plant environmental restoration project is subject to the joint authorities of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 United States Code § 9601 et seq.), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300), and the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. The U.S. Environmental Protection Agency (EPA) is the CERCLA regulatory authority. The State of Texas, as represented by the Texas Commission on Environmental Quality (TCEQ), is the RCRA regulatory authority.

A 1994 Memorandum of Agreement (MOA), between the EPA and TCEQ, established procedures to coordinate and integrate the remedial processes under the federal and state requirements for

CERCLA and RCRA, respectively, and to minimize the duplication of effort under equivalent phases of corrective/remedial action. The agreement also established lead and oversight responsibilities for EPA and TCEQ. Under the MOA, the EPA and TCEQ shared oversight of response actions for chemical releases at the Site. EPA was responsible for oversight of response actions for radiological releases.

The CERCLA Interagency Agreement (IAG), effective February 2008, sets forth the roles and responsibilities of the agencies for implementing and overseeing the remedial activities pursuant to CERCLA, the NCP, and Executive Order 12580, as amended by Executive Order 13016. The IAG focuses on the phase of the project from issuance of the Proposed Plan to selection, design, and construction of the remedy.

## **Wastes and Volumes**

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The principal soil contaminants at Pantex units evaluated for remedial action were RDX, trinitrotoluene (TNT), and depleted uranium. Sixteen contaminants above drinking water standards are present in the perched aquifer, dominated by the presence of RDX, hexavalent chromium, perchlorate, and trichloroethene (TCE).

Approximately 900 acres were evaluated for residual soil contamination. The main perched ground water covers approximately 11 square miles, with a current water volume of approximately 15.1 billion gallons (BWXT Pantex/SAIC, 2007). The volume of impacted perched groundwater is approximately 7 billion gallons.

## **Health Considerations**

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The ground water pumped from the Ogallala Aquifer provides drinking and irrigation water to the City of Amarillo and the surrounding area.

Explosives; TCE; chromium; and perchlorate are the primary contaminants present in the perched aquifer, which is approximately 150 feet above the Ogallala Aquifer. The selected ground water remedy for the perched aquifer is designed to significantly reduce or eliminate the potential for downward migration of contaminants from the perched aquifer to the Ogallala.

Surface water run-off from the facility is directed into on-site playas. All on-site playas are considered wetlands. Texas Tech University Agricultural Research Station uses surface water from Playa 4 for both irrigation of crops and watering livestock.

Interim and final actions summarized in the 2008 ROD have mitigated potential impacts to ground water and exposure to contaminated soils.

## **Record of Decision**

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Public review and comments were requested on the remedial alternatives evaluated for the Pantex Plant with notice of the Proposed Plan on March 17, 2008. DOE/NNSA held a public meeting on March 31, 2008, to explain the Proposed Plan and the alternatives presented, and to receive formal comments. Comments were addressed in the Responsiveness Summary section of the Record of Decision (ROD) (Section 3.0), issued September 2008.

On September 25, 2008, the Environmental Protection Agency approved the Sitewide Record of Decision (ROD) for the U.S. Department of Energy/National Nuclear Security Administration (USDOE/NNSA) Pantex Plant Superfund Site, Carson County, Texas. The document is the only, and final, ROD for the site and selects response actions for 47 contaminated soil units and, in particular, the contaminated perched ground water. Reference: <http://www.pantex.com/about/environment/erDocs/index.htm>



## Community Involvement

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DOE/NNSA, EPA, and TCEQ have routinely met with the public throughout the site investigation and assessment process to discuss the project schedule, and status of ongoing fieldwork, including the implementation of interim corrective measures, interim stabilization measures, and removal actions. A combination of regularly scheduled and special (non-routine) meetings provided opportunities for residents and other interested parties to be involved in cleanup decisions at the site.

Meetings were held quarterly to focus on the investigation and evaluation of contaminated sites, and included discussion of CERCLA early actions and interim corrective measures. Since transition from construction completion to long-term operation and monitoring of the constructed remedial systems, the frequency has been reduced to twice a year. USDOE/NNSA will continue to update the public during the operation and maintenance phase with semi-annual meetings, tentatively scheduled for the first Monday in May and November. If the need arises, USDOE/NNSA is committed to increase the frequency of these meetings or hold special meetings to provide timely communication of pertinent information. The next meeting is scheduled for November 5, 2012, in Panhandle, Texas.

## Technical Assistance Grant

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Availability Notice: N/A

Letters of Intent (LOI)

- 1) 6/1/99 - Serious Texans Against Nuclear Dumping (STAND)
- 2) 6/25/99 - Amarillo Chamber of Commerce
- 3) 6/25/99 - Amarillo Hispanic Chamber of Commerce
- 4) 6/25/99 - Baptist St. Anthony=s Health System

LOI Newspaper Notice: 6/16/99

Grant Award: Awarded on 1/20/00 to STAND.

7105 W. 34th Avenue, Suite E  
Amarillo, TX 79109

Pamela S. Allison is the TAG Administrator

Final TAG application for second grant received from STAND on February 6, 2003.

2nd TAG awarded May 2003 for \$100,000. Budget/project period: 5/12/03 - 4/12/06.

An additional \$51,417 was added to the award in February 2005, extending the budget/project period to 4/11/07.

STAND selected 3 Technical Advisors (TAs).

A compliance review was conducted in mid-summer 2005.

## Contacts

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EPA Remedial Project Manager	Camille Hueni	214-665-2231
EPA Community Involvement Coordinator	Bill Little	214-665-8131
EPA Site Attorney	George Malone	214-665-8030
EPA Regional Public Liaison	Donn R. Walters	214-665-6483
TCEQ Project Manager	Fay Duke	512-239-2443
TCEQ Field Operations	Jim McWilliams	806-468-0520

EPA Superfund Region 6 Toll Free Number: 1-800-533-3508

TCEQ Superfund Toll Free Number: 1-800-633-9363

Information Repositories: Amarillo College Lynn Library  
2201 S. Washington  
Amarillo, Texas 79109-2411

Carson County Library  
401 Main  
Panhandle, Texas 79068